ABSTRACT

The research about mechanical behavior of rock conducted at Mutiara village, Samboja district, Kutai Kartanegara region, East Borneo province. In the rock's mechanical behaviors there are static mechanical behaviour and dynamic mechanical behavior. Static mechanical behavior can be known by conducting uniaxial test whereas the other can be known by conducting ultrasonic velocity test. Some of lithology tested are : clay, coallyclay, silt, coal, and sand. By conducting all those test we can get period time for each lithologi (T_p), Velocity of primer wave (V_p), Uniaxial Compression Strength (σ_c), Poisson ratio (ν) and Young modulus (E). Those data can be used to determine the correlation between velocity of ultrasonic wave with UCS, the relationship between static mechanical and dynamic mechanical behavior and also quality of rock masses with velocity index.

The corelation between velocity of ultrasonic wave (V_p) and UCS (σ_c) can be determined. Here the equation for each lithology :

Clay ; $\sigma_c = 0{,}032V_p - 27{,}72$

Coallyclay ; $\sigma_c = 0{,}034V_p - 29{,}73$

Silt ; $\sigma_c = 0{,}05V_p - 4{,}051$

Coal ; $\sigma_c = 0{,}019V_p - 16{,}10$

Sandstone ; $\sigma_c = 0{,}020V_p - 17{,}57$

The equation poisson ratio's static (ν_{Statik}) with poisson ratio's dynamic ($\nu_{Dinamik}$) and modulus young's static (E_{Statik}) with modulus young dynamic ($E_{Dinamik}$) can be determined with . With second the equations linear, the relationship between static mechanical and dynamic mechanical behavior in the research location can be determined. With use a linear graph approach the equation for each lithology :

Clay ; $\nu_{Static} = 0{,}960\nu_{Dynamic} + 0{,}009$ and $E_{Static} = 0{,}023E_{Dynamic} - 14{,}18$

Coallyclay ; $\nu_{Static} = 1{,}048\nu_{Dynamic} - 0{,}008$ and $E_{Static} = 0{,}063E_{Dynamic} - 37{,}42$

Silt ; $\nu_{Static} = 0{,}894\nu_{Dynamic} + 0{,}025$ and $E_{Static} = 0{,}016E_{Dynamic} - 12{,}58$

Coal ; $\nu_{Static} = 1{,}151\nu_{Dynamic} - 0{,}031$ and $E_{Static} = 0{,}288E_{Dynamic} - 187{,}7$

Sandstone ; $\nu_{Static} = 1{,}168\nu_{Dynamic} - 0{,}025$ and $E_{Static} = 0{,}007E_{Dynamic} + 10{,}06$

The corelation between quality of rock masses and velocity index (VI) in the research location can be determined by using Karpuz equation (*1990*) and King & McConel (Braybrooke, *1988*). The result from clay, coallyclay, coal, and sandstone have a great quality of rock masses with velocity indeks 0 - 1,0. Meanwhile, silt has a good quality of rock mass with velocity index 0,6 - 0,8.